

Title of the Invention

CELLULOSIC FIBERBOARD BUILDING CONSTRUCTION PANEL HAVING REINFORCING BANDS ON EXPANSIVE SURFACE

Cross-Reference to Related Application

5 This application is a division of United States Patent Application Serial No. 10/160,999, which was filed on June 3, 2002.

Technical Field of the Invention

10 This invention pertains to a cellulosic fiberboard panel, which is a building construction panel reinforced in a novel manner. This invention contemplates that reinforcing bands, which may be cementitious, are applied on an expansive surface of a cellulosic fiberboard panel.

Background of the Invention

15 Commonly, cellulosic fiberboard panels are made by severing each panel, via water jets or otherwise, from a continuous web of cellulosic fiberboard, as made on a fiberboard-making machine, such as a Fourdrinier machine, from cellulosic fibers, which may be wood fibers, bagasse fibers, or other cellulosic fibers. Cellulosic fiberboard panels are used widely in building construction, as wall sheathing, as insulating panels, as roofing underlayments, as flooring underlayments, and otherwise.

20 Characteristically, unless made, coated, or treated with cementitious materials, asphaltic materials, or other non-permeable materials, cellulosic fiberboard panels are permeable to water vapor. Because of their permeability to water vapor, cellulosic fiberboard panels are desirable for installations where mold or mildew might thrive unless water vapor that would be otherwise trapped could
25 permeate such panels, such as installations of wall sheathing over spaced studs, at

outer walls of buildings. However, as compared to plywood panels and to other building panels, cellulosic fibreboard panels are not as strong, unless reinforced.

As exemplified in numerous prior patents including United States Patent Re. 32,329, which is a reissue of United States Patent No. 4,339,405, and including
5 United States Patents No. 4,402,751, No. 4,406,703, No. 4,981,518, No. 5,744,078, No. 5,846,894, and No. 6,001,169, it has been known heretofore to blend cementitious materials with cellulosic fibers, whereby to make reinforced, water vapor-impermeable, cellulosic fiberboard panels.

Summary of the Invention

10 In a building construction panel made of cellulosic fiberboard and having two expansive surfaces, two longitudinal edges, and two transverse edges, each expansive surface having four corners and each expansive surface having an overall area, this invention provides an improvement wherein the panel has bands of a reinforcing material, for which a cementitious material is preferred. The
15 bands cover a minor portion of the overall area of a given one of the expansive surfaces. The panel is devoid of the reinforcing material except at the bands.

The bands may include two diagonal bands, each of which extends between diagonally opposite ones of said corners of the given one of the expansive surfaces. The bands may include two longitudinal bands, each of which extends
20 along a respective one of the longitudinal edges of the given one of the expansive surfaces. The bands may include two transverse bands, each of which extends along a respective one of the transverse edges of the given one of the expansive surfaces. Preferably, the bands include such diagonal, longitudinal, and transverse bands.

25 As a method to reinforce a panel made of cellulosic fiberboard and having two expansive surfaces, two longitudinal edges, and two transverse edges, each

expansive surface having four corners and each expansive surface having an overall area, this invention provides a step of wherein applying bands of a reinforcing material, for which a cementitious material is preferred, so as to cover a minor portion of the overall area of a given one of the expansive surfaces, wherein the panel is devoid of the reinforcing material except at the bands.

Two diagonal bands of the reinforcing material may be thus applied so that each of the diagonal bands extends between diagonally opposite ones of said corners of the given one of the expansive surfaces. Two longitudinal bands of the reinforcing material may be thus applied so that each of the longitudinal bands extends along a respective one of the longitudinal edges of the given one of the expansive surfaces. Two transverse bands of the reinforcing material may be thus applied so that each of the transverse bands extends along a respective one of the transverse edges of the given one of the expansive surfaces. Preferably, such diagonal, longitudinal, and transverse bands are applied so as to extend as noted.

Brief Description of the Drawings

Figure 1 is a fragmentary, perspective, somewhat schematic view of a series of cellulosic fiberboard panels being reinforced in a manner contemplated by this invention, while such panels are being conveyed.

Figure 2, on a slightly larger scale, is a top plan of a representative panel of the series, after the representative panel has been reinforced in the manner illustrated in Figure 1.

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Detailed Description of the Illustrated Embodiments

As illustrated in Figure 1, a series of cellulosic fiberboard panels 10 are being reinforced in a manner contemplated by this invention, while such panels 10 are being conveyed by a conveyor C from a fiberboard-making machine, such as a Fourdrinier machine, which is not illustrated. Each panel 10 has two expansive surfaces 12, two longitudinal edges 14, and two transverse edges 16, each expansive surface 12 having four corners 18 and each expansive surface 12 having an overall area. Each panel 10 is reinforced by reinforcing bands of a cementitious material, which is applied by spraying a slurry containing the cementitious material onto a given one of the expansive surfaces 12 of said panel 10 and by allowing the cementitious material to cure. The cementitious material may be one of the cementitious materials disclosed in those prior patents identified hereinbefore, the disclosures of which patents are incorporated herein by reference. Presently, the cementitious material disclosed in United States Patent No. 5,846,894 is preferred.

As illustrated in Figure 2, in which a representative panel 10 having been reinforced in the manner noted in the preceding paragraph is illustrated, the reinforcing bands of the cementitious material include two diagonal bands 20, each of which extends between diagonally opposite corners 18 of the given one of the expansive surfaces, two longitudinal bands 22, each of which extends along a respective one of the longitudinal edges 14 of the given one of the expansive surfaces 12, and two transverse bands 24, each of which extends along a respective one of the transverse edges 16 of the given one of the expansive surfaces 12. Thus, the reinforcing bands of the cementitious material form triangular patterns, which reinforce the representative panel 10. The reinforcing bands of the cementitious material, as applied, cover a minor portion of the overall

area of a given one of the expansive surfaces 12. The representative panel 10 is devoid of the cementitious material except at the reinforcing bands. Thus, over a major portion of the overall area of the given one of the expansive surfaces 12, the representative panel 10 remains permeable to water vapor.

5 As illustrated in Figure 1, the slurry to produce each diagonal band 20 on each panel 10 is applied via a nozzle 30, which moves transversely across each panel 10 as such panel 10 is being conveyed by the conveyor C in a longitudinal direction, which is indicated by large arrows. One such nozzle 30 leads and the other nozzle 30 trails so that the nozzles 30 do not interfere with each other. Each
10 nozzle 30 can be continuously operated in a back-and-forth manner so as to apply the slurry to produce the diagonal bands 20 on successive panels 10 being conveyed. As illustrated in Figure 1, the slurry to produce each longitudinal band 22 on each panel 10 is applied via a nozzle 32, which remains in a fixed position and which can be continuously operated so as to apply the slurry to produce the
15 longitudinal bands 22 on successive panels 10 being conveyed.

As illustrated in Figure 1, the slurry to produce the transverse band 24 on the trailing edge of a given panel 10 being conveyed and the slurry to produce the transverse band 24 on the leading edge of the next panel 10 being conveyed are applied simultaneously by tandem nozzles 34, which move diagonally across the
20 noted panels 10 and in the longitudinal direction indicated by large arrows, from a starting position at a given side of the noted panels 10 being conveyed to a finishing position at the other side of the noted panels 10 being conveyed, as the noted panels 10 are being conveyed in the same, longitudinal direction. In Figure 1, the starting position is at the far side of the noted panels 10 being conveyed and
25 the finishing position is at the near side of the noted panels 10 being conveyed. The nozzles 34 are operated only when moving from the starting position to the

finishing position, from which the nozzles 34 are moved to the starting position after each operation to apply the slurry to produce the transverse band 24 on the trailing edge of a given panel 10 being conveyed and the slurry to produce the transverse band 24 on the leading edge of the next panel 10 being conveyed.